

Abstract

A semiconductor chip for forming an electronic image in a digital camera includes an offset canceling column buffer for use with active pixel sensors having a small electrical buffer amplifier within each pixel. The active pixel sensors are arranged on a semiconductor chip with simultaneous access and reset lines. Each active pixel sensor includes a source follower current amplifier, which introduces small variations in offset voltage, causing pattern noise to be introduced into the output signal of the sensed image. A method and apparatus is disclosed for addressing an array of active pixel sensors in a sequence coordinated with a column buffer for canceling pattern noise. To cancel pattern noise, the current row N in the APS cell array is accessed and sampled. Next, the following row $N+1$ is accessed thereby resetting the current row. Finally, the previous row N in the APS cell array is accessed a second time and sampled. Stored samples from the prior row N are subtracted from the previously sampled signals of the same prior row N to provide an output pixel signal value for which the APS offset voltage (pattern noise) is cancelled. In addition, accessing a row of the APS cell array $M+1$ rows ahead of the current row N electronically controls image exposure time, which is equal to M times the row scan rate.